

AP336.112 3 Outputs 19" Power Supply, 55 Watt

- ◆ High efficiency: 80%
- ◆ ACin wide range: 88...265V AC
DCin wide range: 105...300V DC
- ◆ 8 HP plug in width
- ◆ H15 standard pinout
- ◆ Power rail sharing
- ◆ Meets EMC standards
EN 50081-1 (EN 55022/B), EN 50082-2
EN 61000-4, VDE 0160/2 and NAMUR



EN 60 950



Power Supply AP336.112

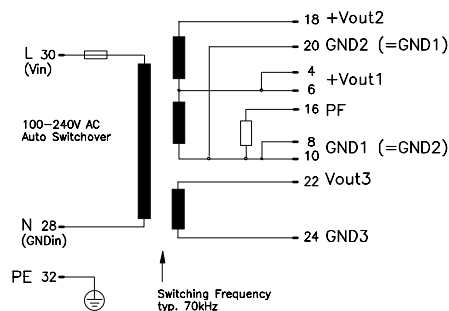
This triple-output power supply is optimized for data processing and computing (3A @ +12V, 1A @ 12V). The power unit uses a bridge-mode wide-range converter. It operates with high efficiency over the total input and output range. It operates over a wide range (100 - 240V AC) without switch over. Hold-up time is over 200ms at 230V AC.

Load distribution is flexible and there is no minimum load.

EMC compatibility is a major feature. It has low spurious noise, and noise suppression meets VDE 0871 class B. Noise immunity meets EN 61000-4 and VDE 0160 class 1, even at full load. Over-voltage and over-temperature protection avoid problems even in extreme working environments.

See the web for current data sheet version:
www.puls-power.de

Schematic:



Vout [DC]	Iout	Pout	Features	Order-No.
Vout1 +5.15V	10A	55W	Wide input range, PF, OTP, OVP	AP336.112
2 +12V	3A	36W		
3 12V	1A	12W		
Max. total power:		55W		

"F" appended to Order No. means front panel 8 HP included and fitted.

Accessories: H15 connector, 6.3mm flat contacts: **ZP100**
H15 connector with soldering pins: **ZP120**

Warranty: 2 years from date of delivery.

Output

Voltage Vout1,2,3		Fixed.
Accuracy Vout1	max. ± 0.5%	Tuning tolerance.
Vout2	—	Unregulated.
Vout3	max. ± 2%	@ Iout3 = 0.5A.
Sense lines	None	Not available.
Minimum load	None	Not necessary, regulation details see page 2.
Output power Pout	max. 55W	Total power.
Noise, Ripple Vout1	max. 20mVpp	20Hz...200kHz.
Vout2/3	max. 10mVpp	20Hz...200kHz.
Including spikes Vout1	max. 20mVpp	20Hz...20MHz.
Vout2/3	max. 10mVpp	20Hz...20MHz.
Over-voltage protection	typ. 6.2V (Vout1)	Threshold accuracy ± 8%.
Derating	1.5W/K	+55° to +70°C Ta.
Operating indicator	1 green LED	On the front, Vout1.
Isolation Vout to Vin	SELV	EN 60 950, VDE 0805 .
Vout1/2 to Vout3	max. 500V AC	

All outputs are protected against open-circuit, short-circuit, and overload.

Mechanical: 8HP/3U board (DIN 41494),
Al/Mg alloy cover for component side,
plastic cover for bottom side,
LxWxH = 171.93 x 40.64 x 110mm (100),
the length includes the connector, see page 4.

Weight: App. 430g

Connector: H15 (DIN 41612), coding option,
max. load per pin 11A @ 70° C.

Input

Line input AC	100...240V AC	Wide-range converter.
· Range	88...265V AC	Full spec.
Line input DC	275V DC	Wide-range converter.
· Range	105...300V DC	Full spec.
Line frequency	47...63Hz	DC or 400Hz, see page 2.
Input current rms.	max. 1.5A	@ 88V AC.
Noise suppression	EN 55 022/B	10kHz...30MHz, conducted.

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Output (continued)

				+5,15V	+12V	12V	
Voltage regulation:							
· Line regulation		max.	%	0.1	3	1.0	88...265V AC.
· Load regulation stat.	ΔU_{stat}	max.	%	+0.5/-1	± 3	± 4	Open-circuit to full load, lout2 only valid @ lout1 $\geq 0.7A$ and $V_{in} = 230V$ AC.
· Load regulation dyn.	ΔU_{dyn}	max.	%	± 7	± 2.1	± 0.5	10%...90%...10% load change, lout2/3 only valid at lout1 ≥ 0.7 and $V_{in} = 230V$ AC. Till Vout is within tolerance.
Response time	t_s	max.	ms	5			
· Temperature coefficient		typ.	%/K	± 0.015			
Ripple		max.	mVpp	20	10	10	20Hz...200kHz, ACnom, @ lout = 100%.
· incl. spikes		max.	mVpp	20	10	10	20Hz...20MHz, ACnom, @ lout = 100%.
Current limitation							
· Threshold		typ.	W	65			Fixed, total power.
· Short-circuit		max.	A	25	10	2.5	No foldback till Vout1=3V, below that periodic restarts.
Start delay	t_{Delay}	typ.	s	1.2			After switch on.
On and off characteristic				No overshoot			Approximately monotonic.
Load capacity		max.	μF	10,000	2,200	2,200	Do not exceed for safe start up.

Input (continued)

AC input range		V AC	88...265	Full spec.
DC input range		V DC	105...300	Full spec.
Derated DC range		V DC	75...105	Different values for hold-up time, input current, ripple, Pout; for details contact supplier (no start below 105V).
		V DC	300...380	Full working, but air- and leakage distances not longer than according to VDE 0805.
Frequency range		Hz	47...63	Full spec.
Derated frequency range		Hz	63...400	Increased leakage currents.
Inrush current	max.	A	20	Wait min. 30s before switching on again (cold-start), NAMUR standard met ($T_a = +25^\circ C$).
Hold-up time	min.	ms	200	@ 230V AC, lout = 100%, see figure page 3.
	min.	ms	15	@ 88V AC, lout = 100%, see figure page 3.
Internal fuse			5x20mm T3.15A/250V	In the L line, as per IEC 127/2-5. To replace, see page 4.
Input range selection			Wide range	

Logic Functions

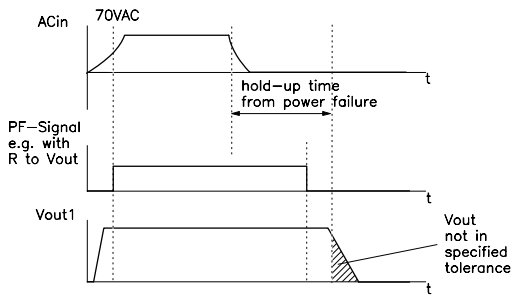
Power Fail signal PF			Power fail	Open-collector signal ($U_{max} = 30V$, $I_{max} = 5mA$).
· PF high if			ACin > 70V AC	Open-collector.
Hold-up time				
· from power failure to PF-signal	min.	ms	200	@230V ACin.
	min.	ms	30	@110V ACin.
	min.	ms	10	@88V ACin.
· from PF-signal	min.	ms	5	lout1 = 100%, Vout1 $\geq 4.75V$.

Electromagnetic Compatibility

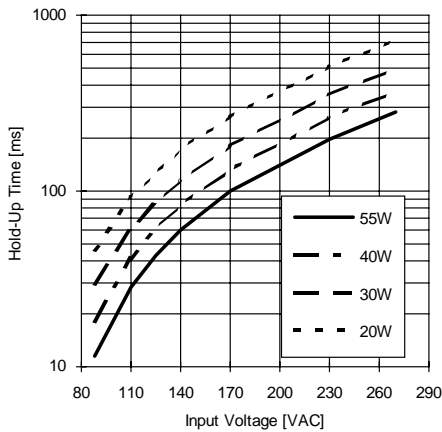
Emissions according to EN 50081-1				EN 50081-2 is also satisfied
· Radio interference, EN 55011, EN 55022			Class B	Conducted 10kHz...30MHz.
Immunity according to EN 50082-2				EN 50082-1 is also satisfied
· Electrostatic discharge ESD, EN 61000-4-2			8kV direct discharge (level 4)	
			15kV air discharge (level 4)	
· Radiated fields, EN 61000-4-3			10V/m (level 3)	To ACin, Vout and signal lines: length = 1m.
· Fast transients, EN 61000-4-4			4kV (level 4)	Coupled to ACin line.
			2kV (level 2)	Coupled to DCout line.
			2kV (level 4) cap. coupling	Coupled to Vout and signal lines.
· Surge transients, EN 61000-4-5			4kV (isolation class 4)	Common mode, unit on.
			2kV (isolation class 4)	Differential mode, unit on.
			5kV	Common mode, unit off.
· Transient voltage, IEC 255			Satisfied	
· NAMUR-prescription			750V / 0.3ms (class 1)	Valid for total load range.
· Transient resistance, VDE 0160 §5.3.1.1.2			300V AC / 0.5s	
· Over-voltage resistance (PULS standard)				

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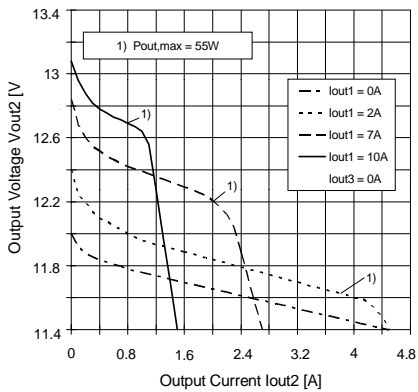
PF-Signal and Hold-Up Time



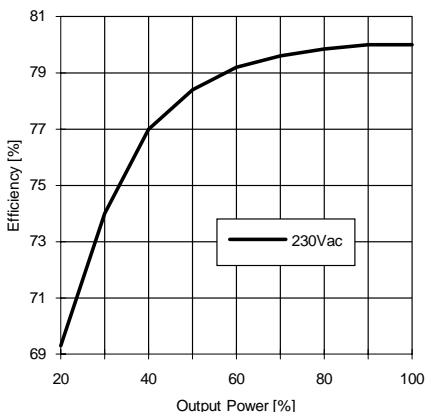
Min. Hold-Up Time



Output Characteristics



Typ. Efficiency



Protection

Unit protection

• Overload	Yes	Total-power limit.
• Short-circuit proof	Yes	Unlimited.
• Open-circuit proof	Yes	
• Over-temperature (OTP) typ. (internal temperature) typ.	+90° C +88° C	Switch off. Switch on.
• Reverse battery prot.	Yes	
• ACin range selection	Wide range	

Load protection

• Over-voltage (OVP) Threshold	Yes	Switch off.
Accuracy	typ. 6.2V max. ± 8%	
Restart		Periodic.

Safety

Electrical safety

• Test voltage (each unit) according to EN 60 950 for t = 2sec	3kV AC 2.5kV AC 500V AC	Primary / secondary. Primary / PE. Secondary / PE.
• Air- and leakage distance	6.4 / 8mm 4mm	Primary / secondary. Primary / PE.
• Isolation resistance	min. 5MΩ	VDE 0551.
• Protection class	I	VDE 0106 part 1, IEC 536.
• PE resistance	< 0.1Ω	VDE 0805.
• Protection system	IP20	DIN 40050, IEC 529.
• Leakage current	max. 0.2mA	EN 60 950 (47...63Hz line) .
• Safe low voltage	SELV	EN 60 950, VDE 0805, VDE 0160.
• Over-voltage class	II	VDE 0110 part 1, IEC 664.

Touch safety

• Penetration protection	Finger test > Ø 3mm	VDE 0100 §6, EN 60 950, VBG4. e.g. screws, small parts etc.
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Operation and Ambient Area

Application class	KSF	DIN 40040.
Operation temperature	max. 0° ... +70°C	Ta (measured at 1cm distance).
• Derating range	+55° ... +70°C	Derating.
Storage temperature	typ. -20° ... +100°C	Ta.
Humidity	max. 95%	Non-condensing.
Mechanical usage	Vertical	See page 4.
• Lateral spacing	None	No gap needed.
Cooling	Normal convection	Don't obstruct air flow.
Dirt protection level	max. 2	VDE 0110 part 1.
Vibration	0.075mm	IEC 68-2-6 (10...60Hz).
Shock	11ms / 15g	IEC 68-2-27 (3 shocks).
Operation height	max. 2,000m	Above sea level.

Efficiency and Power Loss

AP336.112	typ. 80% / 14W	@230V ACin, Pout = 100%.
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Reliability and Lifetime

MTBF according to Siemens standard SN29500	typ. 270,000h	230VAC, Iout = 100%, +40°C Ta.
Only long life (>2,000h@105° C) electrolytic capacitors are used.		
Function test	100%	Test certificate enclosed.
In-circuit test	Yes	
Run-in (burn-in)	24h	Full load, Ta = +55° C, on/off cycle.

PULS Munich

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This technical information is valid for +25° C ambient temperature and 5 min. run in time, unless otherwise stated.

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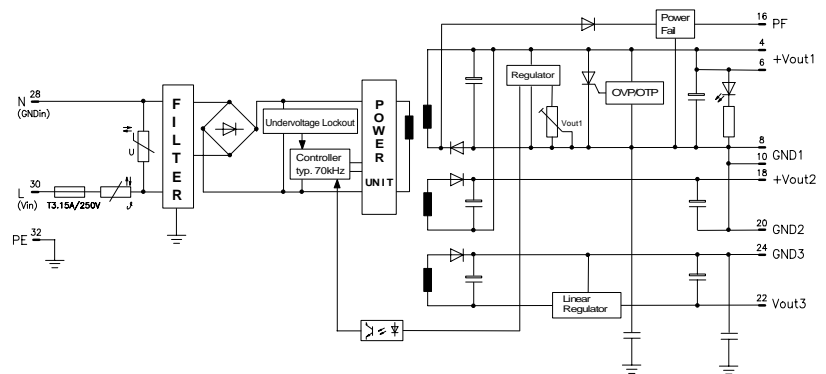
Fuse

The PSU has electronic protection against external short-circuits. In case of an internal defect, a fuse disconnects the unit. It can only be replaced by opening the unit which should be done by the supplier.

Installation for Operating

The unit is constructed for 19" systems:
 Ensure that pin 4 of H15 connector is on top. For other installation considerations consult your representative. Ensure free air flow.

Schematic

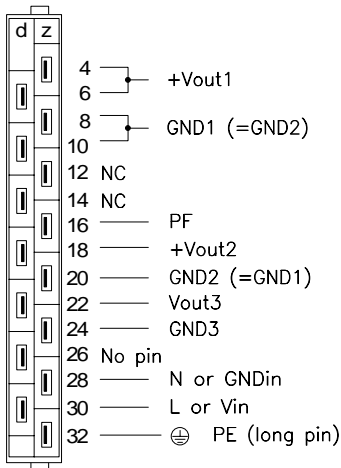


Dimensions and Connections

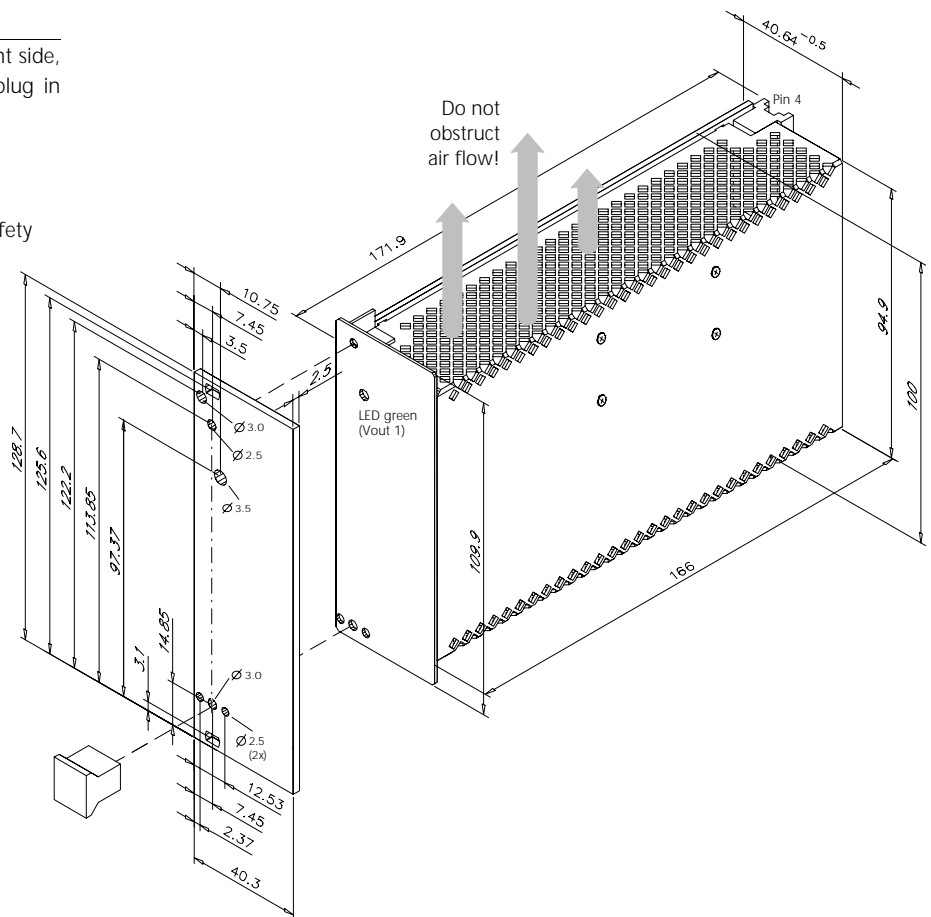
19" board, with Al/Mg alloy cover on component side, and a plastic cover on the bottom side. 8HP plug in width.

Caution:

Do not remove any screws on box, as internal safety connections could be disconnected!



H15 pinout (DIN 41612)
 NC = No Connection - Do not use!



Modifications (contact supplier)

Lower cost versions.

Accessory ZP510

Installation set for mounting on DIN rail.